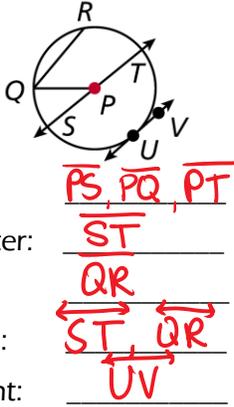


Circles

- 12.1.a Learning Target: Identify tangents, secants, and chords.
- 12.1.b Learning Target: Use properties of tangents to solve problems.
- 12.2.a Learning Target: Apply properties of arcs.
- 12.2.b Learning Target: Apply properties of chords

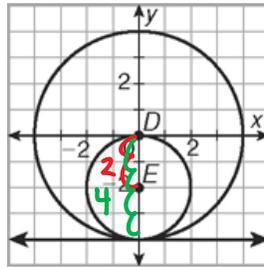
Identify each line or segment that intersects  $\odot P$ . (12.1. a)



Radius: PS, PQ, PT  
 Diameter: ST  
 Chord: QR  
 Secant: ST, QR  
 Tangent: UV

Identify the radius of each circle. Then write the equation of the tangent line. (12.1. a)

Radius  
 $\odot D = 4$   
 $\odot E = 2$   
Tangent  
 $y = -4$



JK, JL, and JM are tangents  
 $JK = (3x - 1.2)m$  and  $JM = (2x + 1.8)m$   
 Find JL. (12.1. b)

$3x - 1.2 = 2x + 1.8$

$x = 3$

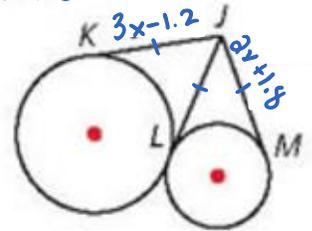
$JK = JL$

$3(3) - 1.2$

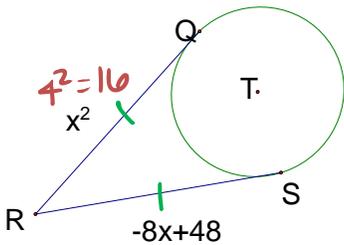
$9 - 1.2$

$7.8$

$JL = 7.8$

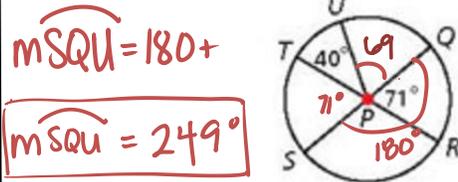


QR and RS are tangent to circle T.  
 Find QR. (12.1. b)



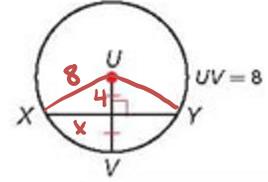
$x^2 = 16$   
 $x^2 = -8x + 48$   $QR = 16$   
 $x^2 + 8x - 48 = 0$   
 $(x+12)(x-4) = 0$  or  $QR = 144$   
 $x = -12, x = 4$

Find the measure of  $\widehat{SQU}$  (12.2. a)



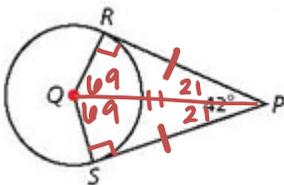
$m\widehat{SQU} = 180 +$   
 $m\widehat{SQU} = 249^\circ$

Find the length of XY. (12.2. b)



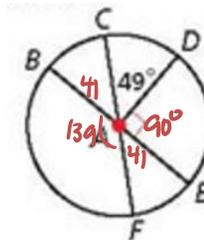
$x^2 + 4^2 = 8^2$   
 $x^2 + 16 = 64$   
 $x^2 = 48$   
 $x = 4\sqrt{3}$   
 $XY = 2(4\sqrt{3})$   
 $XY = 8\sqrt{3}$

PR and PS are tangent to  $\odot Q$   
 Find  $m\angle Q$ . (12.1. b)



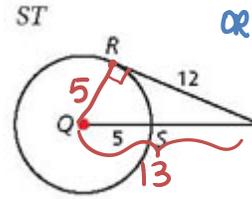
$m\angle Q = 2(69)$   
 $m\angle Q = 138^\circ$

Find the measure of  $\widehat{BED}$  and  $\widehat{BC}$  (12.2. a)



$m\widehat{BED} = 270^\circ$   
 $m\widehat{BC} = 41^\circ$

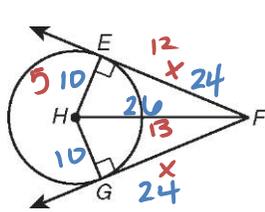
TR is tangent to  $\odot Q$ .  
 Find ST. (12.1. b)



$QR = 5^2 + 12^2 = (5+x)^2$   
 $25 + 144 = (5+x)^2 + x^2$   
 $169 = x^2 + 10x + 25$   
 $0 = x^2 + 10x - 144$   
 $0 = (x+18)(x-8)$   
 $x = 18$   $x = 8$   
 $ST = 13 - 5$   
 $ST = 8$

Let's take it up a notch!

- 10) The area of  $\odot H$  is  $100\pi$ , and  $HF = 26$ .  
What is the perimeter of quad HEFG?



(12. 1. b)

$$A = \pi r^2$$

$$100\pi = \pi r^2$$

$$100 = r^2$$

$$r = 10$$

$$\text{Perimeter} = 10 + 10 + 24 + 24$$

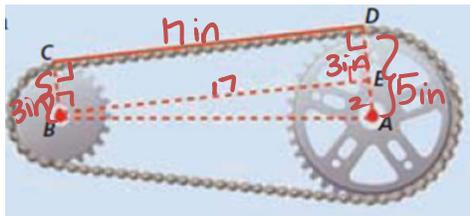
$$\boxed{P = 68 \text{ units}}$$

- 11)  $\overline{IH}$ ,  $\overline{IK}$ , and  $\overline{KL}$  are tangent to  $\odot A$ .  
What is  $IK$ ? (12. 1. b)

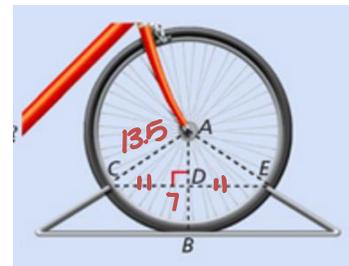
1st:  $y^2 - 10 = 4y + 2$   
 $y^2 - 4y - 12 = 0$   
 $(y - 6)(y + 2) = 0$   
 $y = 6$   $y = -2$   
 $1J = 4(6) + 2 = 26$   
 or  
 $1J = 4(-2) + 2 = -6$

2nd:  $5x + 1 = 6x - 3$   
 $4 = x$   
 $JK = 5(4) + 1 = 21$   
 3rd:  $IK = 26 + 21$   
 $\boxed{IK = 47}$

- 12) The diagram shows the gears of a bicycle.  
 $AD = 5$  in and  $BC = 3$  in and  $CD$ , the length of the chain between the gears, is 17 in. (12. 1. b)



- 13) Lindsay's bike has wheels with a 27 in. diameter.  
(12. 2)



radius = 13.5 in

- a) What type of quadrilateral is BCDE? Why?

Rectangle  $\rightarrow$   $CD$  is tangent to  $OB$  and  $OA$  and intersects both circles @ the radii, the right angles are formed. Since all  $\angle$ s are right  $\angle$ s, it's a rectangle!

- b) Find  $BE$  and  $AE$ .

$$BE = 17 \text{ in}$$

$$AE = 2 \text{ in}$$

- c) What is  $AB$  to the nearest tenth of an inch?

$$2^2 + 17^2 = AB^2$$

$$293 = AB^2$$

$$\boxed{17.1 \text{ in} = AB}$$

- a) What are  $AC$  and  $AD$  if  $DB = 7$  in.

$$AC = \frac{27}{2} = 13.5 \text{ in}$$

$$AD = 13.5 - 7 = 6.5 \text{ in}$$

- b) What is  $CD$  to the nearest tenth of an inch?

$$6.5^2 + CD^2 = 13.5^2$$

$$42.25 + CD^2 = 182.25$$

$$CD^2 = 140$$

$$\boxed{CD = 11.83 \text{ in}}$$

- c) What is  $CE$ , the length of the top of the bike stand?

$$CE = 2(11.83)$$

$$\boxed{CE = 23.66 \text{ in.}}$$

Time to Reflect ☺

Part 1: Self-Assess your understanding of today's lesson out of 5 points:

1 (Oh no)

2

3 (I am okay)

4

5 (could teach this!)

Part 2: Action Plan

If you do not feel like you could teach this, what steps are you going to take today and tomorrow to better understand this material?